

What is claimed is:

1. A filter cartridge which is prepared by winding a non-woven fabric strip comprising a thermoplastic fiber around a perforated cylinder in a twill form, wherein the non-woven fabric strip satisfies the following equation (A):

$$\log_{10} Y < 3.75 - 0.6 (\log_{10} X) \quad (A)$$

wherein X (cm³/cm²/sec) is an airflow amount of the non-woven fabric strip measured in accordance with JIS L 1096-A (1990), and Y (g/m²) is a basis weight thereof.

2. A filter cartridge which is prepared by winding a long fiber non-woven fabric strip comprising a thermoplastic fiber around a perforated cylinder in a twill form, wherein the non-woven fabric strip satisfies the following equation (B):

$$\log_{10} Y < 3.75 - 0.75 (\log_{10} X) \quad (B)$$

wherein X (cm³/cm²/sec) is an airflow amount of the non-woven fabric strip measured in accordance with JIS L 1096-A (1990), and Y (g/m²) is a basis weight thereof.

3. A filter cartridge which is prepared by winding a non-woven fabric strip comprising a thermoplastic fiber around a perforated cylinder in a twill form, wherein in winding in a twill form, a number (W) of winding the non-woven fabric strip from one end to the other end in a longitudinal direction of the perforated cylinder is one to 10 per a length of 250 mm in the perforated cylinder.

4. The filter cartridge as claimed in claim 3, wherein when a 2-fold value (2W) of the winding number (W)

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is represented by a fraction having a denominator of two figures or less which is a non-reducible approximate value, the denominator is 4 to 40.

5. The filter cartridge as claimed in any one of claims 1 to 3, wherein at least a part of fiber intersections of the non-woven fabric strip is thermally bonded.

6. The filter cartridge as claimed in any one of claims 1 to 3, wherein the non-woven fabric strip has a width of 0.5 to 40 cm.

7. The filter cartridge as claimed in any one of claims 1 to 3, wherein a product of a width (cm) and a basis weight (g/m²) of the non-woven fabric strip is 10 to 200.

8. The filter cartridge as claimed in any one of claims 1 to 3, wherein the non-woven fabric strip has a thickness of 0.02 to 1.20 mm.

9. The filter cartridge as claimed in any one of claims 1 to 3, wherein the non-woven fabric strip is thermal compression bonded by means of a heat embossing roll having an embossing area rate of 5 to 25%.

10. The filter cartridge as claimed in any one of claims 1 to 3, wherein the filter material of the filter cartridge has a void rate of 65 to 85%.

11. The filter cartridge as claimed in claim 1 or 3, wherein the non-woven fabric strip is of a long fiber non-woven fabric.

12. The filter cartridge as claimed in claim 11, wherein the long fiber non-woven fabric is produced by a spun bonding method.

13. The filter cartridge as claimed in claim 1 or 3, wherein the non-woven fabric strip is of a melt blown non-woven fabric.

14. The filter cartridge as claimed in any one of claims 1 to 3, wherein the thermoplastic fiber is a composite fiber comprising a low melting resin and a high melting resin, a difference of the melting points between these resins being 10°C or more.

15. The filter cartridge as claimed in any one of claims 1 to 3, wherein the thermoplastic fiber is a fiber formed from at least one thermoplastic resin selected from the group consisting of a polyester resin, a polyamide resin, a polyethylene resin and a polypropylene resin.

16. A process for producing a filter cartridge, which comprises winding a non-woven fabric strip comprising a thermoplastic fiber around a perforated cylinder in a twill form, wherein the non-woven fabric strip satisfies the following equation (A):

$$\log_{10} Y < 3.75 - 0.6 (\log_{10} X) \quad (A)$$

wherein X (cm³/cm²/sec) is an airflow amount of the non-woven fabric strip measured in accordance with JIS L 1096-A (1990), and Y (g/m²), and Y (g/m²) is a basis weight thereof.

17. A process for producing a filter cartridge, which comprises winding a non-woven fabric strip comprising a thermoplastic fiber around a perforated cylinder in a twill form, wherein in winding in a twill form, a number (W) of winding the non-woven fabric strip from one end to the other end in a longitudinal direction of the perforated cylinder is one to 10 per a length of 250 mm in the perforated cylinder.

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